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EXAMINER	
WOODS, ERIC V	
ART UNIT	**PAPER NUMBER**
2628	

DATE MAILED: 03/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/648,301	KOMARECHKA, ROBERT G.	
	Examiner	**Art Unit**	
	Eric Woods	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 9/15/03
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Remarks pages 1-6, filed 15 September 2005, with respect to the rejection(s) of claim(s) 1-5 under 35 USC 103(a) have been fully considered and are persuasive in view of applicant's amendments.

Therefore, the rejection of claims 1-5 under 35 USC 103(a) has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of various references as below.

The objection to claims 4 and 5 stands withdrawn because of applicant's amendments.

Note Remarks page 1. Applicant ~~simply cannot~~ state: "Crawfis teaches a method of visualization of a 3D vector field on a 2D surface. The method of Crawfis differs from that of Komarechka hence is not inclusive of Komarechka's method."

No evidence or support is provided for the attempt to differentiate Crawfis from the instant application. That one statement is all the arguments made with respect to the Crawfis reference.

Next, applicant argues that the techniques of the instant application are different from that of the other applications (e.g. they use hue, color, saturation, etc and allow the user to customize the various parts of the color plots). However In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the above) are not recited in the rejected claim(s). Although the claims are interpreted in light of the

specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Again, applicant argues various details about how the calibration of Kerekes does not match that of the instant application. Such differences are not recited in the claims.

~~An examination of this application reveals that applicant is somewhat unfamiliar with patent prosecution procedure. While an inventor may prosecute the application, lack of skill in this field usually acts as a liability in affording the maximum protection for the invention disclosed.~~ Applicant is advised to secure the services of a registered patent attorney or agent to prosecute the application, since the value of a patent is largely dependent upon skilled preparation and prosecution. The Office cannot aid in selecting an attorney or agent.

A listing of registered patent attorneys and agents is available on the USPTO Internet web site http://www.uspto.gov in the Site Index under "Attorney and Agent Roster." Applicants may also obtain a list of registered patent attorneys and agents located in their area by writing to the Mail Stop OED, Director of the U. S. Patent and Trademark Office, PO Box 1450, Alexandria, VA 22313-1450.

Examiner notes that applicant's invention does contain what **appears** to be patentable subject matter (that is, claim 5), and the other claims are possibly also allowable, but need to be rewritten extensively to render them non-indefinite. If applicant were to write the claims up in such a manner that it was clear that the vectors were selected by the user in some manner, and then converted to a scattergram format,

and then re-displayed to the user, as a continuous process flow, such claims would probably contain allowable subject matter as well. Again, applicant is encouraged to obtain a patent attorney, since examiner does believe that applicant has patentable subject matter, but the claims need extensive redrafting. The Office cannot redraft claims to the extent required for that, however.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 15 September 2005 was filed after the mailing date of the Office Action on 19 April 2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-5 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for converting coordinates to spherical coordinates, calibrating the information, and then visually determining the orientation and intensity of 3-dimensional vectors within a vector field, does not reasonably provide enablement for rapidly visually correlating 3 dimensional vectors of a common orientation and intensity, rapidly isolating specific vector orientations and determining their exact co-ordinate location, displaying a scattergram of orientations, enhancing the visual discrimination of subtle variation in vector orientation and intensity, and presenting these in such a

manner to incorporate rapid color change to indicate time-varying data. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The specification provides a basis for generating three-dimensional vector layouts with arrows for flow coordinate visualization, along with calibration and coordinate conversion. Beyond this, the specification is not enabling for the other elements within the claim. Next, it is unclear how these methods work, whether or not it is the user or computer executes them, whether or not they must in fact be executed consecutively (as is the case with most normal process claims) or the order in which they are related to each other. Next, the specification simply does not provide for allowing discrimination of subtle variations and a method for rapidly isolating such coordinate information (steps iv, vi, and vii).

Finally, the 'methodology' of the last claim is not clear at all. It does not explain how such a methodology would work, whether or not or how the user would operate such a methodology, and/or how such data would be presented, much less other details

Claim 5 has the same defects as claim 1 and is rejected in the same manner.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, claim 1 recites in steps ii-viii using the term 'a method'. A method claim is not allowed to multiple methods within it, except as specifically enumerated steps, because it is unclear how they relate to each other without linkage information. That is, there are several 'methods for' various tasks within claim 1 – these need to be changed to 'step for …' or similar language. It is indefinite because it is unclear how each of the 'methods' is interrelated in addition to the above – e.g. if the listed elements are steps, then it is assumed that they are executed sequentially. However, when the term 'method' is used, it is unclear how those items are related to each other. This rejection is further justified on the grounds that the first two portions of the claim consist of 'steps of' or 'steps for' which are permitted, where the rest of the claim is not clear for the reasons specified above.

Typically, something saying 'a method for' is its own independent claim, not a separate clause. The wording simply does not allow one of ordinary skill to understand how each step would function.

Finally, the 'methodology' of the last claim is not clear at all. It does not explain how such a methodology would work, whether or not or how the user would operate such a methodology, and/or how such data would be presented, much less other details.

Claims 2-5 are indefinite for failing to correct the deficiencies of their parent claim.

Claim 5 has the same defects as claim 1 and is rejected in the same manner. The claim(s) are narrative in form and replete with indefinite and functional or

operational language. The structure that goes to make up the device or the steps and their interrelationships that make up the method must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. The claim(s) must be in one sentence form only. Note the format of the claims in the patent(s) cited.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller in view of Crawfis, Kerekes, Kawasaki (US PGPub 2001/0017542 A1), and Goyal et al (US 5,625,575)(note: Goyal is a modification, and only for a small portion of the rejection).

As to claim 1,

A method of displaying three-dimensional vector orientations and intensities on a two-dimensional surface comprising:

i. The steps of:

a. Collecting said three-dimensional information, (Reference Mueller on pages 658 and in more detail on pages 659 and 660 establishes how the magnetic data was gathered, in that it is three-dimensional and gathered by airborne, surface, and borehole investigations.)(Kerekes teaches the acquisition of such data from boreholes, as in Fig. 1 and as taught in [0004-0006] it clearly represents data gathering as well)(Kawasaki Fig. 2, equipment)

b. Transforming said three-dimensional Cartesian information to spherical co-ordinates, (Such information is typically gathered in orthogonal (Cartesian) coordinates, as Kerekes does in [0026] and particularly in [0032], where it is stated the sensing apparatus has three orthogonal sensors, thusly the signals generated are orthogonal and thusly would inherently be in a Cartesian coordinate system or reference frame, where a transform is applied to it to generate three-dimensional spherical coordinate data [0032-0033]. Clearly, such spherical coordinates are assigned a predetermined display pattern, wherein in Fig. 14, step 152, and the three-dimensional image is generated, which obviously has a form and pattern to it)

c. Assigning a predetermined display pattern to said spherical co-ordinates, and (Kerekes -- Clearly, such spherical coordinates are assigned a predetermined display pattern, wherein in Fig. 14, step 152, and the three-dimensional image is

generated, which obviously has a form and pattern to it.)(Clearly Mueller teaches in Figs. 1 and 2 on page 658, particularly Fig. 2, specific patterns)

d. Illustrating a visual rendition of said predetermined display pattern on said two-dimensional surface, (Kerekes and Mueller both illustrate displaying the vector fields on a computer monitor, see Mueller Figures 1-2, etc)(Kawasaki Figures 5A-5C, [0012,0045-0047, and the like])

ii. A step of calibrating said three-dimensional information, (Kerekes teaches the calibration of equipment for three-dimensional measurements in Fig. 4 [0011], and especially in [0027] where it is taught that each borehole is specifically calibrated for location, azimuth, position, etc., which clearly establishes a step of "calibrating said three-dimensional information", given that this step can performed at any time during the process.)

iii. A method for rapidly and visually determining the orientation and intensity of 3 dimensional vectors within a vector field, (Mueller clearly teaches in Figs. 1 and 2 on page 658 the use of a method for rapidly and visually determining the orientation of vectors within a 2D and 3D field respectively, as those arrows can obviously be in color, and color visualizations techniques are well known in the art, as taught by Crawfis in pages 56-57, particularly the right side of page 56 and as illustrated in Fig. 3.)(Kawasaki clearly performs three-dimensional or stereo display of such data and vector sets [0044-0047])

iv. A method of rapidly visually correlating 3 dimensional vectors of a common orientation and intensity, (Specific vector points can be seen in the graphs of Crawfis

(e.g. Fig 3, page 57) and Mueller (Figs. 1 and 2), and clearly one could extract vector orientations based on the line leading away from the point in question, and the exact coordinate location, as in page 658, where it states that "the arrows within Figure One indicate the direction and intensity of the magnetic field", and clearly the points are laid out on a grid; it is a trivial modification and well known in the art to have a graph set up such that a user can click on a point and the system will show the exact coordinates of the point or item in question to get more details.)

v. A method for rapidly isolating specific vector orientations and determining their exact co-ordinate location, (Mueller clearly teaches in Figs. 1 and 2 on page 658 the use of a method for rapidly and visually determining the orientation of vectors within a 2D and 3D field respectively, as those arrows can obviously be in color, and color visualizations techniques are well known in the art, as taught by Crawfis in pages 56-57, particularly the right side of page 56 and as illustrated in Fig. 3. Crawfis illustrates on page 60 the use of varying colors in vector field illustrations, particularly in for example Figure 8. The use of different colors in vectors definitely constitutes the recited step (iv) of "rapidly visually correlating 3D vectors of a common orientation", since vectors of a comparable color and direction would be easily visually ascertained (e.g. see Crawfis page 56).)

vi. A method for quickly displaying a scattergram of orientations and intensities within a specified study area or volume, (Applicant shows in his drawings in Fig. 10 what he terms 'scatter plots' which are nothing more than another way of display vectors (e.g. such a technique is taught in Mueller Figs. 1 and 2, Crawfis Figs. 3 and 5-8, and prima facie in Kerekes [0058-0062]), and a study volume is illustrated in Figs. 1 and 2 of

Mueller. Further, it is trivially well known in the art to have visualization programs that allow zooming or specification such that a user can view only a selected range or coordinate volume. Finally, Crawfis shows plots of vector orientation and magnitude that are similar to that shown in applicant's Figures 9 and 10, which look approximately the same, and thusly examiner would argue that they constitute 'scatter plots')

vii. A method of enhancing the visual discrimination of subtle variation in vector orientation and intensity, (Clearly, the color schemes of Mueller and particularly those of Crawfis teach the use of subtle color patterns to "enhance the visual discrimination of subtle variation", and such schemes can prima facie be adjusted so that more subtle variations have wider color variations (just a question of the degree of grading in the color) and one of ordinary skill in the art would be able to modify the system to do so in a trivially easily manner (e.g. a few lines of graphics / OpenGL™ code).)(Kawasaki clearly teaches in Figures 5A-5C and [0012,0044-0046] that using difference in color, shade, or length to show intensity can vary the color, which would be an expansion of and clarification to the techniques shown in Mueller Figure 2, which clearly shows three-dimensional display of such data)

viii. A methodology of presenting data that allows for the ability to incorporate rapid color change to the pixelated or voxelated image, allowing for a time varying display hence providing the user the ability to visualize slow time, real time or fast time visualization of the individual vector orientations and intensities within a dynamically changing vector field. (Finally, Kerekes in [0027-0034] explains the operation of his system, wherein data is inherently taken in time-based format, where the time of reception of the signal

allows the user to derive information about the sub-surface features in question. Crawfis clearly teaches on page 55 that systems that utilizes particles to illustrate movement are time-based and further that his work generates data that has time steps and time dynamics, which clearly means that the data is moving with respect to time, and obviously for a climate simulation to be useful, it must be able to be viewed in a time mode. It is trivially well known in the art to implement playback systems for such simulation data – such data are shown on television, in movies, and at conferences in moving format all the time. Obviously, the work of Crawfis encompasses such, but since it is only a paper, no video clip could be attached to illustrate the true movement of their simulations, but many screenshots were. In any case, setting the playback speed is also trivially well known (see Microsoft Windows™ Media Player, Realplayer, or any other media player type system). Obviously, for a time-based simulation, the dynamics must be viewable in order to be comprehensible. Also, the reason one would want to control the playback speed of such a simulation is to allow more careful study of the changes between different steps and/or frames, whether in a climatic data set such as Crawfis or in time-based data such as Kerekes.)(Goyal 30:15-26)

For the reasons set forth in the first and second paragraphs of this rejection, It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the systems of Kerekes, Crawfis, and Mueller in the manner set forth above and to modify them for the reasons and in the manners set forth above.

As noted above, reference Crawfis clearly teaches the use of three dimensional vector orientations on a two-dimensional surface (e.g. a computer monitor)(see

abstract, page 55), specifically for the visualization of three-dimensional vector fields on computer monitors, where prima facie a three-dimensional vector field will show vector orientations. Reference Mueller clearly establishes (see Abstract, page 657) that three-dimensional magnetic vector data was obtained during the survey, along with other data concerning the deposit, and two-dimensional representations of the vector field are shown in Figure 1 on page 658, whilst a three-dimensional visualization of some magnetic orientations with direction information is shown in Figure 2 on page 658, which clearly illustrates three-dimensional vector orientations in any case. Reference Kerekes is a teaching reference for certain details of coordinate mapping, which shows a three-dimensional model of borehole locations in Fig. 1, and in Fig. 14, step 152, the system clearly generates a three-dimensional image and in [0005-0006] it teaches that the purpose of the invention is map the three-dimensional vector field of the geologic formation in question. All three references are analogous art and are directed to the same problem solving area, in that they are all directed to visualization and processing of geologic data in three dimensions and vector fields generally as noted in the above paragraphs.

Next, reference Mueller on pages 658 and in more detail on pages 659 and 660 establishes how the magnetic data was gathered, in that it is three-dimensional and gathered by airborne, surface, and borehole investigations. Kerekes teaches the acquisition of such data from boreholes, as in Fig. 1 and as taught in [0004-0006] it clearly represents data gathering as well, while Crawfis is more focused on data visualization. Kerekes measures generated "complete vector fields" [0025] which

clearly represent the total 3D vector map. Therefore, both Kerekes and Mueller teach collecting three-dimensional information.

Reference Mueller teaches most of the limitations of the instant claim, but does not teach some of the details of modulating the shown vector fields for intensity and the like, where Crawfis and Kawasaki show these limitations as explained above. It would have been obvious to combine the techniques of Kawasaki with Mueller, because Kawasaki allows for further control of how intensity is shown – that is, variations in both color and shade, which would obviously show and convey more detail to the user. Reference Crawfis teaches the idea of capturing time-series of a simulation, which would obviously allow a user to play back such results, but does not expressly teach this. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination above to allow playback of the results of a simulation or data capture run, as discussed in Goyal 30:15-26, so as to allow the user to control the speed of visualization and control the rate of speed for playback.

As to claim 2, this is a obvious variation. Personal computers have been capable of printing screen shots ever since the 1980s, and originally the "PrintScreen / SysRq" button on an IBM PC was capable of printing the screen when it was pressed, and clearly such functionality is a fundamental of the art. Further, printers and plotting devices have been known for twenty years, and this is a trivially obvious variant. Motivation and combination are taken from the parent claim. Examiner takes Official Notice of this fact. Note that applicant did not dispute this point in the last Office Action.

As to claim 3, obviously reference Mueller teaches geomagnetic data. Since only the primary reference is utilized, no separate motivation or combination is required and that from the rejection to the parent claim is herein incorporated by reference.

As to claim 4, reference Mueller teaches data gathered by airborne means (page 660), surface means (page 660), and boreholes (pages 657-658, Figure 2, et cetera). Clearly such measurements, since they are three-dimensional, are inherently triaxial (as are the measurements of Kerekes). That satisfies three of the conditions on the list, and it is merely "of the list" which means all four limitations are not required. Motivation and combination is taken from the rejection to the parent claim.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 4,811,220 to McEuen, which teaches visualization of magnetic data using various methods, and display of vector orientations and the like;

US 5,592,598 to Yamrom, which clearly teaches that color can be used to indicate the orientation of various vector data (Abstract, note also scatterplot in Figure 1, noted as prior art), and Figure 6.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Woods whose telephone number is 571-272-7775. The examiner can normally be reached on M-F 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eric Woods

March 16, 2006

UChauhan

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER